

REMARKS

Claims 1-13 are pending. Claims 11-13 are added. Claims 9 and 10 are withdrawn from consideration. Claims 4-8 are considered separate species of generic claim 1. Reconsideration and allowance based on the above amendment and following remarks are respectfully requested.

112 2nd Paragraph

The Office Action rejects claim 2 under 35 U.S.C. 112, 2nd paragraph as being indefinite. Specifically, the Office Action alleges that the term “said package” lacks antecedent basis. Applicant has amended claim 2 by removing this term to address this issue. Applicant respectfully submits that claim 2 is now properly construed. Accordingly, withdrawal of the rejection is respectfully requested.

Prior Art Rejections

The Office Action rejects claim 1 under 35 U.S.C. 102(b) as being anticipated by Itabashi et al. (U.S. Pat No. 5,097,304) and claim 3 under 35 U.S.C. 103(a) as being unpatentable over Itabashi in view of Nagata et al. (U.S. Pat No. 4,940,888). These rejections are respectfully traversed.

In recent years the semiconductor substrate has become very thin such that the light reflected from the rear surface is incident on the photoelectric converting portion. This causes a problem as stray light becomes incident on the photoelectric converting portions leading to inaccurate light readings. In embodiments of the present invention, the light shading means is formed on the rear surface of the semiconductor substrate. Therefore, even when the

semiconductor substrate is thin, the light reflected from the rear surface is prevented from being incident on the photoelectric converting portion. The light shading means provides a semiconductor device that is more reliable with less light reading errors. See page 2, line 34 through page 3, line 4 of the specification.

Claim 1

Itabashi teaches an image reading device which includes an array of sensors that form a line sensor. Each sensor includes a light shielding layer, an insulating layer, semiconductor layer (photoconductive layer) and electrodes. As illustrated at least by Fig. 3B, the light shielding members 202, 214 are formed on the surface of the transparent layer 201. The transparent layer forms the rear surface of the sensor structure. The insulating layer 203 is formed over the light shielding members and transparent layer. The photoconductive layer 14 is formed on the insulating layer and electrodes are then formed over the photoconductive layer. It is clear in Itabashi's design that light reflected from the rear surface is incident on the sensor unit since the sensor unit is provided above the transparent substrate. Thus, Itabashi does not address the problem of light reflecting from the rear surface. Further, the light shading means is not formed on the rear surface of the semiconductor substrate, but instead on the surface of the transparent substrate 11.

In Itabashi's design, light is received from the rear surface (the transparent layer) through a window 219. The light is then reflected off an original surface at the top of the sensor structure and through a spacing gap between the electrodes. The light in the gap is able to contact the photoconductive layer. Thus, the incoming light from the rear surface of Itabashi's design does

contact the photoconductive layer. In fact, it is specifically designed so that incoming light from the rear surface contacts the photoconductive layer. See columns 5-6.

In contrast, embodiments of the present invention provide a light shading means that shields a photoelectric converting portion from all light from the rear surface of a semiconductor substrate forming the sensor. The present invention is designed to so that light does not reach the photoconductive converting portion from the rear surface. This is reflected in the language of claim 1 which recites, *inter alia*, “a light shading means for shading an incoming light from the rear surface of the semiconductor substrate to said photoelectric converting portion.” Applicant respectfully submits that Itabashi fails to teach this feature and in fact teaches to the contrary by purposely allowing incoming light from the rear surface to reach the photoconductive layer.

Therefore, applicant respectfully submits that Itabashi fails to teach each and every feature of applicant’s independent claim 1 as required. Accordingly withdrawal of the rejection of claim 1 is respectfully requested.

Claim 3

The Office Action has provided Nagata to teach the light shading means as being a rough surface recited in claim 3. Nagata teaches an image sensor used in facsimiles. The system includes a sensor substrate 1, sensor element 1a, transparent film 6a placed over the sensor substrate and sensor on which an original document 7 is placed. In an embodiment of Nagata the transparent film 6a has a pear-skin matted surface. This is done in order to scatter some light from reaching the sensor. However, Nagata’s design purposely allows light to reach the sensor

from the rear surface. Only a partial amount of light is scattered as light necessarily must reach the sensor in order to obtain data. See column 5, lines 35-67.

Applicant respectfully submits that there is no motivation for combining the pear-skin film of Nagata with the semiconductor shielding layer of Itabashi found within the references themselves or by one of ordinary skill in the art. Itabashi teaches that the shielding layer is made of an electrically conductive material such as metal. See column 6, lines 24-29. Nowhere does Itabashi suggest that metal can be manufactured in the semiconductor process with a rough surface. Nagata teach the use of a removable film. The film is not integrated into a semiconductor process, but positioned on top of the scanning apparatus prior to the document being placed thereupon. Although the film may have a matted surface, this does not teach or suggest that the shielding layer of an integrated semiconductor sensor can be formed to have a rough surface. Nowhere does Nagata teach or suggest using anything other than the transparent removable film with a matted surface. Thus, one of ordinary skill in the art would not look to the removable film of Nagata to replace the integrated light shielding layer of Itabashi.

Therefore, in view of the above, applicant respectfully requests withdrawal of the rejection with respect to claim 3.

Conclusion

In view of the above, applicant respectfully requests reconsideration and withdrawal of the above noted rejections. Applicant respectfully submits that the application is now in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

Application No.: 10/620,461

Docket No.: 0649-0901P

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad J. Billings (Reg. No. 48,917) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By 

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